

IN THE CLAIMS

1. (Currently Amended) A method for analysis comprising:

transmitting electromagnetic radiation of a predetermined wavelength range through a first structure substantially transmitting with respect to said electromagnetic radiation, said first structure comprising a substantially transparent substrate carrying a plurality of spaced-apart metallic islands located on at least one surface of a transparent substrate and said transparent substrate; detecting generating a first optical property measurement of a transmission of said transmitted electromagnetic radiation through said first structure, and generating a first measurement indicative of a response of said first structure to said electromagnetic radiation, said first measurement being representative of a surface plasmon absorption of said first structure following passage of said electromagnetic radiation through said metallic islands and through said transparent substrate;

adsorbing a chemical substance onto said plurality of metallic islands so as to produce a second structure substantially transmitting with respect to said electromagnetic radiation and having a second different plasmon absorption characteristic, said second structure comprising a chemical substance-metallic islands moiety on said transparent substrate; transmitting the electromagnetic radiation through said chemical substance-metallic islands moiety and said transparent substratesecond structure; detecting transmission of said second structure to said electromagnetic radiation, and generating a second optical property measurement indicative of a response of said second structure to said electromagnetic radiation, the second measurement being representative of the surface plasmon absorption of said second structure transmitted

~~radiation following passage of said electromagnetic radiation through said chemical substance-metallic islands moiety and said transparent substrate; and~~

~~employing said first and second optical property measurement of the surface plasmon absorption of the first and second structures, respectively, and said first optical property measurement to provide at least one of a quantitative indication and a qualitative indication of at least one of the following: said chemical substance-metallic islands moiety, a functionality of said chemical substance-metallic islands moiety, said plurality of metallic islands, a functionality of said plurality of metallic islands, said chemical substance and a functionality of said chemical substance.~~

103 (Currently Amended) Apparatus for analysis comprising:

a first structure substantially transmitting with respect to electromagnetic radiation of a predetermined wavelength range to be measured, said first structure consisting of a transparent substrate carrying an adsorption enabling element operative to enable adsorption of a chemical substance onto a plurality of metallic islands on a transparent substrate so as to produce a first chemical substance-metallic islands moiety formed by a plurality of spaced-apart metallic islands on the surface of said substrate and the first chemical substance adsorbed to said surface, wherein said first structure has a certain surface plasmon absorption characteristic with respect to said electromagnetic radiation defining the first structure transmission profile for the wavelength range to be measured, and wherein said first chemical substance is selected to adsorb thereon one or more second chemical substances to form a second chemical substance-first chemical substance-metallic islands moiety on said substrate, thereby enabling formation of a second structure substantially transmitting with respect to said wavelength range and consisting of said

substrate carrying the second chemical substance-first chemical substance-metallic islands moiety
and having a different surface plasmon absorption characteristic defining a different transmission
profile as compared to that of the first structure;

a transmitter configured and operative to transmit the electromagnetic radiation of said
predetermined wavelength range through said the plurality of metallic islands and said transparent
substrate structure and which is further operative to transmit electromagnetic radiation through
said chemical substance-metallic islands moiety and said transparent substrate;

a detector oriented with respect to the structure and said transmitter adapted and
configured to detect the electromagnetic radiation of said wavelength range transmitted through
the structure, and to generate a first optical property measurement of the structure transmission
profile said plurality of metallic islands, and further configured to generate a second optical
property measurement of metallic islands in said chemical substance-metallic islands moiety; and

a processor operative to receive the measurement, analyze the transmission profile of the
structure under measurements, and employ said first optical property measurement and said
second optical property measurement to provide at least one of a quantitative indication and a
qualitative indication of at least one of: said first chemical substance-metallic islands moiety, a
functionality of said first chemical substance-metallic islands moiety, said plurality of metallic
islands, a functionality of said plurality of metallic islands, said first chemical substance and a
functionality of said first chemical substance, said second chemical substance-first chemical
substance-metallic islands moiety, a functionality of said second chemical substance-metallic
islands moiety, said second chemical substance and a functionality of said second chemical
substance.

Claim 178 will be amended commensurate with claim 103.

Claim 209 (New) A sensor device for use in detecting and analyzing at least one predetermined chemical substance by measuring a transmission profile of a structure carrying said predetermined chemical substance, the device comprising:

a first structure substantially transmitting with respect to electromagnetic radiation of a predetermined wavelength range to be measured, the first structure consisting of a transparent substrate carrying a first chemical substance-metallic islands moiety formed by a plurality of spaced-apart metallic islands on the surface of said substrate and the first chemical substance adsorbed to said surface,

wherein said first structure has a first characteristic of a surface plasmon absorption with respect to said electromagnetic radiation defining the structure transmission of said electromagnetic radiation, and

wherein said first chemical substance is selected to be capable of adsorbing thereon said at least one predetermined chemical substance;

the device thereby enabling formation of a second structure substantially transmitting with respect to said electromagnetic radiation, the second structure consisting of said substrate carrying the predetermined chemical substance-first chemical substance-metallic islands moiety, and having a second characteristic of a surface plasmon absorption with respect to said electromagnetic radiation defining a different transmission profile of the second structure, thereby providing the detection of said predetermined substance by detecting a difference in the transmission profile of the second structure as compared to that of the first structure.